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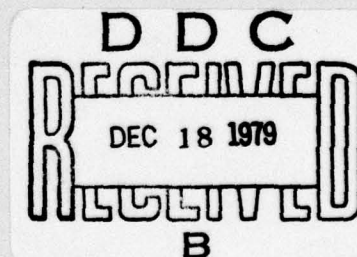
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DELAWARE RIVER BASIN  
SALEM CREEK, SALEM COUNTY  
NEW JERSEY

LEVEL II

CAMP KARNEY DAM  
NJ 00106

PHASE 1 INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM



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DEPARTMENT OF THE ARMY

Philadelphia District  
Corps of Engineers  
Philadelphia, Pennsylvania

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August, 1979

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DEPARTMENT OF THE ARMY  
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS  
CUSTOM HOUSE-2 D & CHESTNUT STREETS  
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO

NAPEN-D

3 DEC 1979

Honorable Brendan T. Byrne  
Governor of New Jersey  
Trenton, NJ 08621

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Camp Karney Dam in Salem County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Camp Karney Dam, initially listed as a high hazard potential structure but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The spillway is considered inadequate since 43 percent of the Spillway Design Flood - SDF - would overtop the dam. (The SDF, in this instance is the 100 year design flood). To insure adequacy of the structure, the following actions, as a minimum are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant, using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar year 1980.



NAPEN-D

Honorable Brendan T. Byrne

b. Within six months from the date of approval of this report, the following remedial actions should be completed:

(1) Remove dead trees on the downstream embankment to lessen the piping potential.

(2) Regrade, compact and seed all of the minor erosion gullies on the embankment slopes.

(3) Place riprap or energy attenuation devices in the downstream main spillway channel to lessen the scouring of the stilling basin and the eventual undercutting of the paved inverts.

(4) Take soundings and study the need for dredging out the lower portion of the lake, at the northwest corner.

(5) Clarify the status of the legal ownership.

c. No additional operation and maintenance procedures other than those presently in effect appear to be warranted. However, the ownership and responsibility for maintenance should be clarified between the County, Township and YMCA.

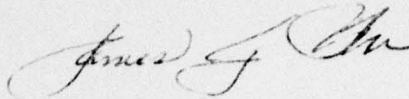
A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman William J. Hughes of the Second District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

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An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,



1 Incl  
As stated

JAMES G. TON  
Colonel, Corps of Engineers  
District Engineer

Copies furnished:  
Mr. Dirk C. Hofman, P.E., Deputy Director  
Division of Water Resources  
N.J. Dept. of Environmental Protection  
P.O. Box CN029  
Trenton, NJ 08625

Mr. John O'Dowd, Acting Chief  
Bureau of Flood Plain Management  
Division of Water Resources  
N.J. Dept. of Environmental Protection  
P.O. Box CN029  
Trenton, NJ 08625

CAMP KARNEY DAM (NJ00106)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 8 May 1979 by Louis Berger and Associates, Inc. under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

Camp Karney Dam, initially listed as a high hazard potential structure but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The spillway is considered inadequate since 43 percent of the Spillway Design Flood - SDF - would overtop the dam. (The SDF, in this instance is the 100 year design flood). To insure adequacy of the structure, the following actions, as a minimum are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant, using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar year 1980.

b. Within six months from the date of approval of this report, the following remedial actions should be completed:

(1) Remove dead trees on the downstream embankment to lessen the piping potential.

(2) Regrade, compact and seed all of the minor erosion gullies on the embankment slopes.

(3) Place riprap or energy attenuation devices in the downstream main spillway channel to lessen the scouring of the stilling basin and the eventual undercutting of the paved inverts.

(4) Take soundings and study the need for dredging out the lower portion of the lake, at the northwest corner.

(5) Clarify the status of the legal ownership.



c. No additional operation and maintenance procedures other than those presently in effect appear to be warranted. However, the ownership and responsibility for maintenance should be clarified between the County, Township and YMCA.

APPROVED: *James G. Ton*

JAMES G. TON  
Colonel, Corps of Engineers  
District Engineer

DATE: 3 Dec 1979

PHASE I REPORT  
NATIONAL DAM INSPECTION PROGRAM

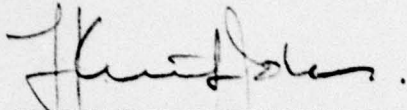
Name of Dam Camp Karney Dam Fed ID# NJ 00106  
NJ ID# 30-8

State Located New Jersey  
County Located Salem  
Coordinates Lat. 3937.9 - Long. 7175.2  
Stream Salem River  
Date of Inspection 8 May 1979

ASSESSMENT OF  
GENERAL CONDITIONS

The Camp Karney Dam is assessed to be in a fair overall condition and is recommended to be downgraded to a significant hazard category. No detrimental findings were uncovered to render a structurally unsafe assessment of the dam itself but overtopping could cause appreciable damage to downstream dams. Further hydraulic studies are recommended taking all dams on this reach of the Salem River into account. Remedial actions to be undertaken in the future are 1) regrade and protect the downstream slopes at the low points, 2) refill and install slope protection at the spillway bridges' downstream wingwalls, 3) remove dead trees and root systems, 4) regrade all erosion gullies on the embankment slopes, 5) dredge the lower portion of Avis mill pond, especially in the north bay at the inflow of Union Grove Branch and 6) place riprap or energy attenuaters in the north spillway stilling basin.

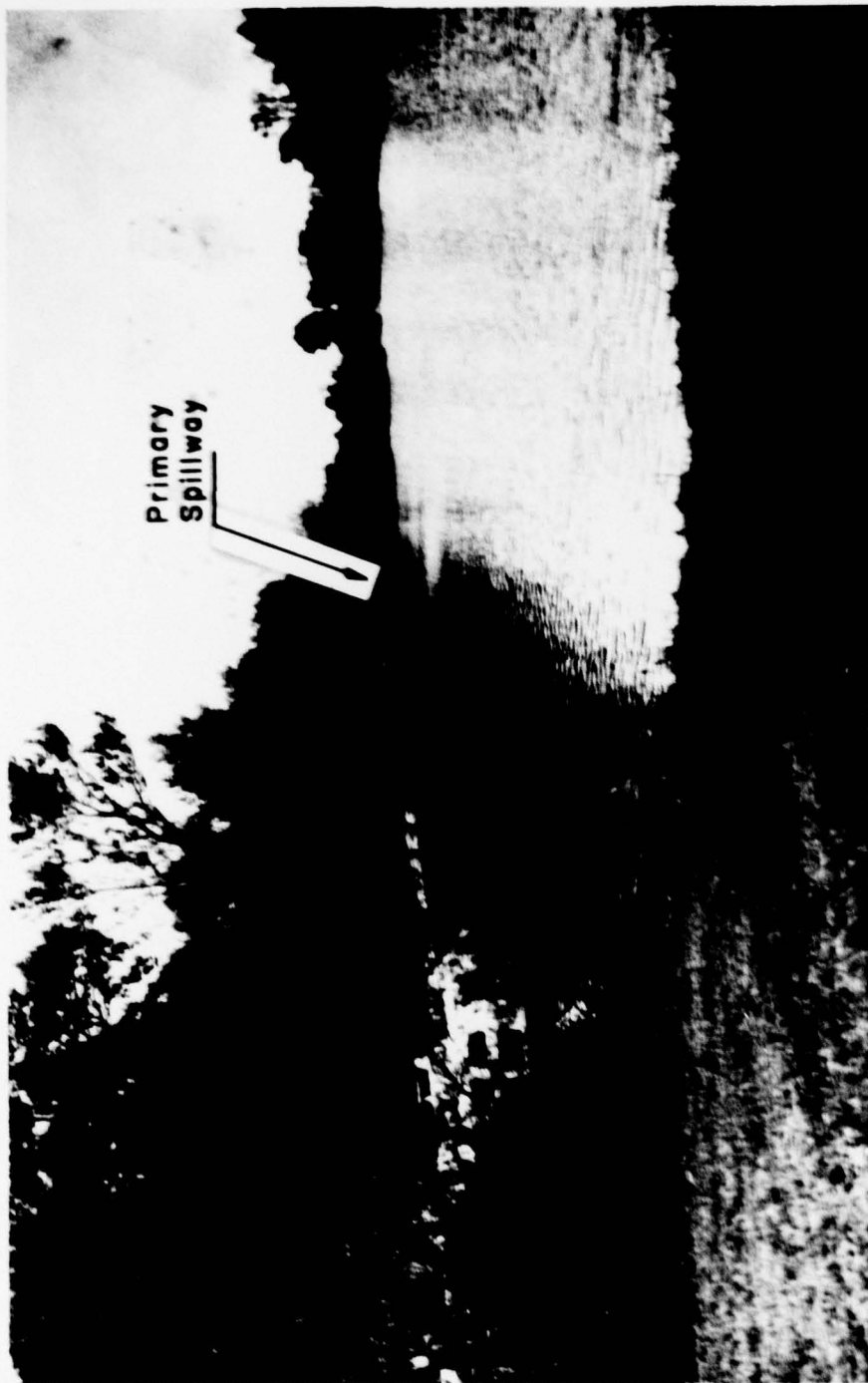
Also, the legal ownership of the dam should be clarified.  
The combined spillway capacity will accomodate only 42%  
of the 100 year design flood and is therefore inadequate.



F. Keith Jolls P.E.  
Project Manager







Primary  
Spillway

OVERVIEW OF CAMP KARNEY DAM

MAY, 1979

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## PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.



PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM  
NAME OF DAM: CAMP KARNEY DAM FED #NJ 00106  
AND NJ ID #30-8

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

This report is authorized by the Dam Inspection Act, Public Law 92-367, and has been prepared in accordance with Contract FPM-36 between Louis Berger & Associates, Inc. and the State of New Jersey and its Department of Environmental Protection, Division of Water Resources. The State, in turn, is under agreement with the U.S. Army Corps of Engineers, Philadelphia to have this inspection performed.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the structural and hydraulic condition of Camp Karney Dam and appurtenant structures, and to determine if the dam constitutes a hazard to human life or property.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The dam at Camp Karney (a.k.a. Camp Crocket) impounds Avis Mill pond and is a 1460 foot long earth structure, with two bridged spillways. A 640 foot portion is situated along Avis Mill Road, a two-lane asphalt County Road while the remaining 820 feet is formed by an irregular earth dike which extends out perpendicularly from a spot just to the right of the principal spillway and then turns and continues to the northeast to the vicinity of an abandoned millrace. The principal (north) spillway is a semicircular steel

sheet piling arch approximately 50 feet in length, and is located near the center roadway abutment (see Figure 2). The second (auxiliary) spillway is a three-sided concrete drop inlet structure located a short distance from the left abutment at the south end of the dam. The crest of this spillway is 6 inches above that of the principal outlet. The embankment slopes vary between 2H:1V and 1H:1V. The upstream face is protected by concrete riprap along the road section. The "center roadway abutment" zone (see Figure 2) is protected by a 130 foot timber bulkhead which is built along the shoreline to the right of the principal spillway.

b. Location

The dam is located on the Salem River, 2 miles southeast of Woodstown, Pilesgrove Township, Salem County, New Jersey, and lies approximately 3/4 mile south of the intersection between Route 40 and Avis Mill Road.

c. Size Classification

The dam at Camp Karney has a maximum height of 13 feet and a maximum storage capacity of 371 acre-feet. Accordingly, this dam is in the small size category as defined by the criteria in the Recommended Guidelines for Safety Inspection of Dams (maximum storage less than 1,000 acre-feet and a height less than 40 feet).

d. Hazard Classification

Based on the Corps of Engineers criteria and the fact that in the event of a failure, some (but not excessive) damage could be inflicted on downstream property, the classification is recommended to be downgraded to significant hazard. The downstream flood plain is undeveloped and consists primarily of agricultural fields and woodland. However, there are one or two farm houses adjacent to the downstream flood plain where a small number of lives and isolated homes might be endangered should the dam collapse. However, these homes



appear to be at or slightly above high water except for one home below the right abutment (it was recorded that this home was not flooded during a 1968 breaching).

e. Ownership

The Camp Karney Dam appears to be jointly owned by the Young Men's Christian Association of Salem County (located in Salem), the Salem County Road Committee, Board of Chosen Freeholders, and Pilesgrove Township. The exact limits of the public Right-of-Way could not be determined. Further, portions of the perimeter earth dike near the right abutment may be on two or more private properties.

f. Purpose of Dam

The dam presently impounds a recreation lake known in earlier times as Avis pond. There is evidence of an old grist mill and the original purpose of the dam was to provide power for a mill waterwheel.

g. Design and Construction History

The dam was constructed many years ago. However, no information was available as to when it was first built, or who built it. The lake and surrounding property formerly belonged to Avis Mills, who operated a water-powered grain mill on Fox Road about 500 feet north of the dam. Remnants of an old raceway are still visible near the mill. In September 1940, the dam was breached in three places. Repairs were carried out almost immediately by the DuPont Company to enable traffic to reuse the crest roadway which was washed out. In July 1941 the dam repairs were inspected and serious seepage zones were noted. In 1951, the dam was again reconstructed and a steel sheet piling overflow arch spillway was constructed in place of the existing timber gate structure at the north end of the paved section of the dam. The design was prepared by Mr. A.P. Smith, DuPont Chambers Works, Deepwater, New Jersey. In June 1968 a 50 feet section of the raceway closure



at the right abutment was washed out and was repaired in July 1969 by A. Clemente Inc. of Penns Grove. Materials used to repair the dam were taken from the lake bed. The extent of downstream damage from this breaching is unknown. E.I. duPont deNemours and Co. have maintained summer camping facilities at this reservoir for many years in conjunction with the Y.M.C.A. and in the past, have provided engineering and economic assistance in maintaining the facility.

h. Normal Operating Procedures

At the present time, there appears to be little in the way of operational procedures as both outlets are basically uncontrolled although the stoplogs at the auxiliary spillway can be hoisted for lowering the lake level.

1.3 PERTINENT DATA

a. Drainage Area

Camp Karney Lake has a drainage area of 11.8 square miles which consists mainly of farm and woodland.

b. Spillway capacity at top of dam - 2,734 cfs

c. Elevation (ft. above MSL)

Top of dam - +52.2

Recreation pool - +46.5

Streambed at centerline of dam - +38.9

d. Reservoir

Length of maximum pool - 4,200 feet

Length of recreation pool - 3,600 feet

e. Storage (acre-feet)

Maximum pool (top of dam) - 371

Recreation pool (spillway crest) - 190

f. Reservoir Surface (acres)

Maximum pool - 38.5  
Recreation pool - 25.5

g. Dam

Type - Earth embankment with two bridged  
spillway structures  
Length - 1460+ feet  
Height - 13 feet  
Top width - 30+ feet  
Side slopes - 2H:1V  
Zoning - unknown

h. Diversion and Regulating Tunnel - None

i. Spillways

Type - 1) Principal: Semicircular steel sheet  
piling arch  
(Effective Length = 50.5')

2) Auxiliary: Three sided concrete drop  
inlet with 8 openings  
(Effective Length = 24')

Crest elevation - 1) Principal: +46.5  
2) Auxiliary +47.0 (stoplogs  
in place).

Gates - None

U/S channel - reservoir

D/S channel - meandering natural channel

j. Regulating Outlets - 3" x 8" x 3'-0" stoplogs  
in auxiliary spillway (each opening)

## SECTION 2 - ENGINEERING DATA

### 2.1 DESIGN

The only information available for review consisted of the Chambers Works Engineering Department drawing DW-8443 - Principal spillway, dated March, 1951. No design computations or structural analyses were available for review. Further, an extensive search of the records of the State Division of Water Resources revealed nothing on file of a technical nature. Records indicate that the southerly bridge (Salem County #4138) was rebuilt in 1964. This work appeared to have consisted of refurbishing the parapets, installing guard railing and widening the super-structure with concrete plank.

### 2.2 CONSTRUCTION

Little information was obtained regarding the actual construction as no as-built plans were available. From the various revisions indicated on the Dupont design plan, the work at the spillways was substantially completed in 1952.

### 2.3 OPERATION

See Section 4.

### 2.4 EVALUATION

#### a. Availability

Sufficient engineering data is believed to be available to assess the overall structural stability. Although there is a record of seepage problems, geotechnical references indicate that the dam is built on recent alluvium deposits of silt and sand with some clay and significant amounts of organic material near the surface. These overlies stratified clay deposits of marine origin and are associated with the Bridgeton formation of interbedded silty sands and gravels. The depth to bedrock is greater than 100 feet.



## SECTION 3 - VISUAL INSPECTION

### 3.1 FINDINGS

#### a. General

The visual inspection was conducted on May 8 when several inches of water were flowing over the main spillway at the right, northerly end of the dam. It was noted that the two lane asphalt roadway is not heavily travelled and has not been repaved in many years and contains many reflection cracks and subgrade failures and ravelling along the edges.

#### b. Dam

Although slightly deeper at the spillways, the average height of embankment is between 8 and 13 feet. The top of crest elevation varies considerably all along the entire length. The side slopes are very irregular and have been scarred by numerous large root systems and surface run-off from the road. Immediately downstream of the left abutment, a sizeable water course enters the downstream channel and a 24" roadway drain has been installed to protect the fill slopes.

The 2H:1V (average) sideslopes steepen up to 1:1 at the spillway wingwalls and both slopes have a heavy growth of brush and numerous large trees, up to 20" diameter. There are numerous broken concrete slabs placed on the upstream face along the road section. In many areas, shallow gullies have been scoured into the slopes, caused principally by roadway run-off.

Approximately 120 feet to the right of the auxiliary spillway the road pavement has settled 3 to 4 inches and a large wet area was observed below the downstream toe which could be the result of seepage. Additionally, there appears to be some seepage around the downstream wingwalls of the principal spillway.

Immediately upstream from the center roadway abutment, a low timber bulkhead has been constructed normal to the dam axis and extends about 130 feet along the northerly shoreline. The area behind this zone and northwest of Avis Mill Road appears to be swampy and low lying (as much as 12 feet below dam crest elevation).

The irregular dike embankment beyond the end of the timber bulkhead extends northeast to a point just beyond the entrance of the millrace. All traces of this are completely obliterated by the lawns of two private residences on the right abutment backslope but it appears the millrace ran between the two houses. The northerly zone of the embankment (where the 1968 failure occurred) is clear of growth and well-grassed and maintained. As previously stated, this right abutment area may be on private properties.

c. Appurtenant Structures

1) Principal Spillway

This highway culvert has a 23 foot long concrete span and abuts the steel sheeting circular spillway weir constructed by Dupont in 1952. The bridge has been modified and widened several times and is in moderate to good condition except for serious cavitation at the bases of the downstream wingwalls. The steel sheeting arch and return walls are in excellent shape and driven true and interlocked properly. The juncture of the thrust block at the end of the arch and the bridge wingwall is tight and shows no crushing or horizontal movement although the weld at the splice between the arch and the short retainer wall (which extends back to the corner of the abutment) is split. In the opinion of the inspection team, this is unimportant. Due to the uniform overflow, the paved invert could not be closely examined but it was noted that excessive exit velocities



have eroded a large stilling basin several feet deeper than the invert flowline and undercut the paved invert, which extends out about 15 feet beyond the west bridge fascia, a depth of four to five feet. Some type of structural modification has been made on the east side of the super-structure. It appears that old posts were removed, probably during the 1952 spillway construction. However, there is no evidence of major structural cracking. Due to the complete lack of differential settlement, this structure is most probably founded on piles. The spillway sheeting is U.S. Steel Corp. "MZ-22" and according to records, is 20 feet long except at the corners where 24 foot lengths were employed. A height of 7.6 feet is exposed across the 23' radius arch.

## 2) Auxiliary Spillway

This outlet at the southerly (left) end of the dam consists of a similar 22 foot span concrete bridge with a three-sided drop inlet which contains eight 3 foot wide openings equipped with stoplogs and lifting devices. There is a creosoted access platform built overtop of the spillway. There is about 2.5 feet of headroom between the spillway crest and the bridge super-structure soffit which was widened in 1964. The structure is in a good integral condition and has a timber maintenance platform built on top of the spillway. The concrete spillway frame is buttressed by counterforts on the downstream side. To a lesser degree than the main spillway, the outflow has scoured out a stilling basin in the downstream channel approximately two feet below the invert flowline and the lower corners of the bridge abutment walls are broken and badly spalled. However, no serious cracking was observed in the wingwalls and it is likewise assumed this structure is founded on timber piling.



d. Reservoir Area

Avis Mill pond is an artificial reservoir and appears to be quite heavily silted up, especially through the narrow neck where the Union Grove Branch flows into the main body of the reservoir. This tributary has a rather large drainage area and discharges directly into the mill pond somewhat to the west of the location of the abandoned mill raceway. Records indicate that a low dike and/or timber gate in this vicinity was breached in 1968 which flooded a downstream area near the intersection of Avis Mill Road and Fox Road. There are at least 2 dams upstream of the study dam (Slabtown Lake and an unnamed reservoir west of Pole Tavern).

e. Downstream Channel

Salem River flows unimpeded one mile after discharging from the study dam to the headwaters of East Lake which is impounded by a road embankment dam with a small circular spillway on East Lake Road. Further downstream, there is another dam at Memorial Lake (in Woodstown). There is evidence of flooding damage at both downstream dams. The floodplain immediately below the study dam is 300 to 500 feet wide and for the most part, heavily wooded and undeveloped. It appears that the natural water course of the Salem River existed at the south spillway but with a slightly lower weir, the north spillway now transmits normal flows. The original streambed of the Union Grove Branch is visible just to the south of the Fox Road-Avis Mill Road intersection but now drains only the low-lying swampy area confined by the right portion of the embankment and Avis Mill Road.

## SECTION 4 - OPERATIONAL PROCEDURES

### 4.1 PROCEDURES

Nothing was observed by the inspection team regarding day-to-day operations. The stoplogs appear to have been replaced within the last 2 years but except for minor control of the lake level, the spillways essentially function as uncontrolled weirs.

### 4.2 MAINTENANCE OF DAM

The roadway pavement and bridge structures are maintained by Pilesgrove Township in a workmanlike fashion as part of their continual road program. It appears that the Y.M.C.A. is presently responsible for some portion of the maintenance of the other elements. However, in 1973 the Salem County Board of Chosen Freeholders installed a new lifting device on the auxiliary spillway. E.I. duPont de Nemours, who previously provided engineering and construction funds at this facility, no longer actively participates in the maintenance.

### 4.3 MAINTENANCE OF OPERATING FACILITIES

The only operating facilities are the 8 sets of stoplogs in the auxiliary sluiceway. The Division of Water Resources has recently directed its correspondence to the Maintenance Committee of the Y.M.C.A. in Penns Grove but it could not be verified whether they actually have a legal obligation for the year-round maintenance (or whether the responsibility rests with Salem County or Pilesgrove Township).

### 4.4 DESCRIPTION OF WARNING SYSTEM

None exists except for monitoring by local Municipal and County personnel during heavy storms.

### 4.5 EVALUATION

Although there are no operational procedures or safeguards, in view of the present condition it is believed that procedures are marginally adequate but the legal responsibility for long-term maintenance should be clarified.



## SECTION 5 - HYDRAULIC/HYDROLOGIC

### 5.1 EVALUATION OF FEATURES

#### a. Design Data

In accordance with the criteria of the Recommended Guidelines for Safety Inspection of Dams, it has been determined that Camp Karney Dam is small in size and is placed in the significant hazard category. Accordingly, the spillway design flood (SDF) was determined by the inspection team to be the 100-year frequency event. The inflow hydrograph was calculated utilizing precipitation data from Technical Paper 40 and NOAA Technical Memo NWS Hydro 35. In accordance with Corps of Engineers directives, the inflow hydrograph and flood routing were performed utilizing the HEC-1 computer program. The discharge for the SDF was calculated to be 6,433 cfs and with the combined spillway capacities before overtopping of 2,734 cfs, can therefore accommodate only 42% of the SDF.

#### b. Experience Data

A small amount of the 1940 Dam Application hydraulic/hydrologic data was available for review. However, this did not conform to present Corps of Engineers criteria and the Central Jersey Curve Run-off produced a design discharge of only 1,250 cfs. Records indicate that this dam has been overtopped at least twice in the past, first in 1940 when three sections of embankment were washed out and secondly in 1968. There are no streamflow records available nor any record of downstream damage.

#### c. Visual Observations

There is little that can be done to appreciably increase the discharge of the present spillways without major reconstruction. The auxiliary spillway capacity is somewhat restricted by the concrete beams in place directly above the crest of weir (see photographs).



d. Overtopping Potential

Based on the appended hydraulic/hydrologic analysis, the dam would be overtopped by approximately one foot in the event of a 100-year frequency storm. Based on the fact that the dam has been overtopped several times in the past and the irregular elevation of the crest elevation, there is considerable potential for future overtopping. The inspection team was also concerned with the flooding potential of the Avis Mill Road in the area north of the main spillway (to the road intersection). The road is several (6 to 8) feet lower than the top of dam in this area.

e. Drawdown

Drawdown can be accomplished by removing the stop logs in the auxiliary spillway. By removing the 8 sets of stop logs, it would take approximately  $7\frac{1}{2}$  hours to dewater the lake to elevation 38.9. This assumes an inflow of approximately 1 cfs per square mile and no tailwater.

## SECTION 6 - STRUCTURAL STABILITY

### 6.1 EVALUATION OF STRUCTURAL STABILITY

#### a. Visual Observations

Based upon the visual inspection, all elements of the Camp Karney dam are felt to be in a moderately sound structural condition except for the excessive cavitation at the bases of both spillway abutment walls and downstream wingwalls. The timber stoplogs in the auxiliary spillway were replaced about 2 years ago and are in a sound condition. As previously stated, the inspection team was concerned with the low-lying swampy area north of the dam as the rather narrow channel which discharges the Union Grove Branch into the main body of Avis Mill Pond appears to be silted up and storm flows from this tributary could again breach the embankment near the right abutment.

Although there appears to be some percolation or seepage near the left end of the dam and behind the spillway walls, the inspection team was not unduly concerned as the embankment in this area is very wide in relation to its height and is stable vis a vis sliding, overturning and shear failure.

#### b. Design and Construction Data

The review of the single available design plan for the circular sheet-piled spillway indicates that it was conservatively designed. Ignoring the arching effect, the MZ-22 section has a section modulus ( $19.0 \text{ in}^3$  per foot) that is over twice that required as a free-standing cantilever. The bridge foundations are believed to be founded on timber piling and have withstood the previous wash-outs with no apparent damage. Both roadway bridge superstructures have been patched, repaired, widened and modified but are in no danger of collapse from normally anticipated vehicular loads. However, a collapse could cause a serious blockage of the channel and it appears doubtful that these bridges would comply with current NJDOT bridge

rating criteria. No design computations were available for any elements of the structures.

c. Operating Records

No records are available.

d. Post Construction Changes

There is no record of major changes since the installation of the circular sheet-piling spillway in 1952. The 1968 reconstruction near the right abutment appears to be essentially a replacement of an old timber gate with an earth embankment. As previously stated, the sloplog planking was recently replaced.

e. Seismic Stability

The Camp Karney Dam is located in Seismic Zone 1 and due to embankment width vs. low height, has negligible potential earthquake vulnerability. Experience indicates dams with adequate stability under static loads will have adequate stability under dynamic loading intensities.



SECTION 7 - ASSESSMENTS/RECOMMENDATIONS/  
PROPOSED REMEDIAL MEASURES

7.1 DAM ASSESSMENT

- a. Subject to the inherent limitations of the Phase I visual inspection, the Camp Karney Dam is classified as being in a fair but satisfactory structural condition although the spillways are incapable of passing the design flood. The dam embankment was built of unknown composition but due to its width to height ratio, is believed to be of a sufficient impervious condition to withstand normal hydraulic heads. The present spillway capacity does not meet the requirements of the Recommended Guidelines for Safety Inspection of Dams, being able to accommodate only 42% of the design flood as calculated by Corps of Engineers criteria. The calculated SDF would overtop the dam in the roadway portion by approximately 1 foot at the various low points along the crest but except for the probable erosion of the downstream face, it is felt that little other damage would occur. It was noted that the crest elevation near the north abutment (where the 1968 breach occurred) is approximately two feet higher than the roadway portion and the slopes and crest are well stabilized with grass.

b. Adequacy of Information

The information gathered for the Phase I inspection is deemed to be adequate regarding the structural stability of the dam. However, no recent surveys have been made and recorded performance information is believed to be non-existent.

c. Urgency

It is recommended that the remedial measures enumerated below be taken under advisement in the future.

d. Necessity for Further Study

Due to the hazard classification and the fact that this dam is the center structure in a chain of five dams, further hydraulic studies are recommended, taking into account the entire reach of the river and the hydraulic interface between the dams.

7.2 RECOMMENDATIONS/REMEDIAL MEASURES

a. Recommendations

On the basis of this visual inspection, improvements to the present spillways are not warranted until further studies are completed. However, the downstream face of the embankment at the low points along the roadway profile could be further protected with riprap or slope paving and in effect, act as auxiliary spillways. Additionally, the embankment areas at the ends of both culvert wingwalls (on the west side) should be regraded and covered with slope protection.

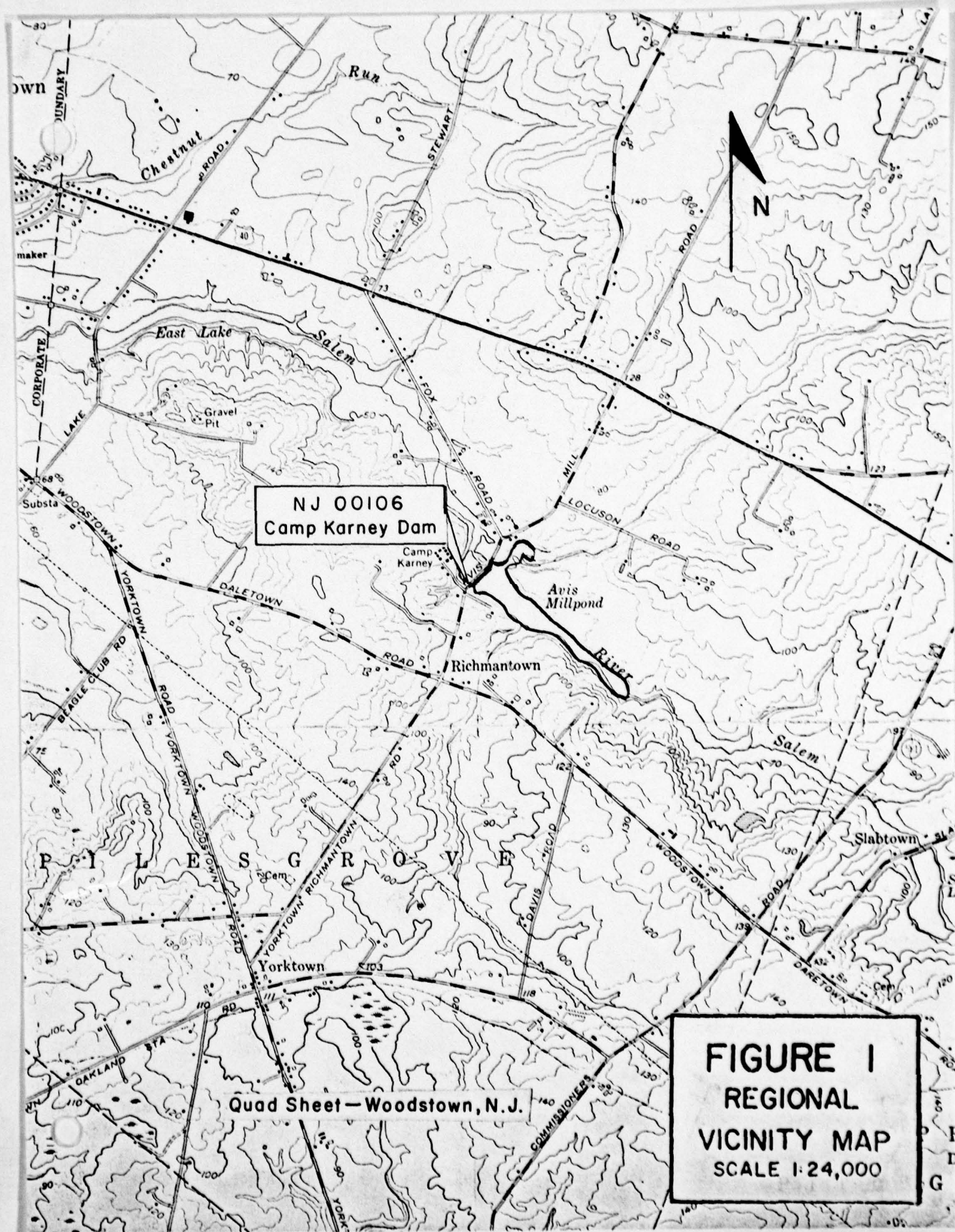
Other remedial measures to be taken under advisement include:

- 1) removal of the dead trees and major root systems on the downstream embankment to lessen the piping potential
- 2) regrade, compact and seed all of the minor erosion gullies on the embankment slopes.
- 3) place riprap or energy attenuation devices in the downstream main spillway channel to lessen the scouring of the stilling basin and the eventual undercutting of the paved inverts.
- 4) Take soundings and study the need of dredging out the lower portion of the lake, at the northwest corner.
- 5) clarify the status of the legal ownership.

b. O&M Maintenance and Procedures

No additional procedures other than those presently in effect appear to be warranted in view of the above assessment. However, the ownership and responsibility for maintenance should be clarified between the County, Township and YMCA.

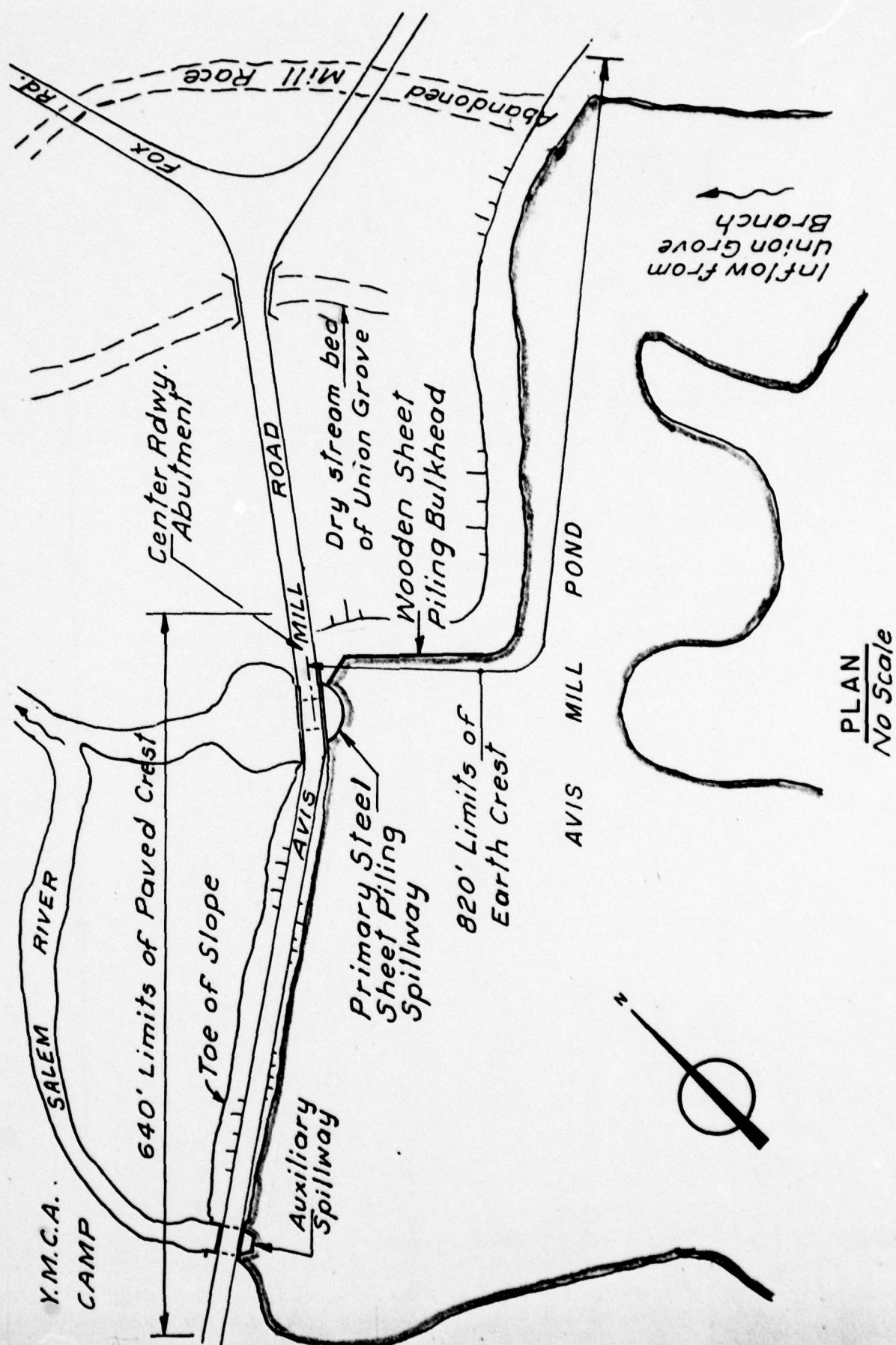




NJ 00106  
Camp Karney Dam

FIGURE 1  
REGIONAL  
VICINITY MAP  
SCALE 1:24,000

Quad Sheet - Woodstown, N.J.



**FIGURE 2.**



[illegible]

FIGURE 3.



Check List  
Visual Inspection  
Phase I

Name Dam Camp Karney County Salem State New Jersey Coordinators NJDEP

Date(s) Inspection 8 May 79 Weather Clear Temperature 70°

Pool Elevation at Time of Inspection 46.8 M.S.L. Tailwater at Time of Inspection 36+ M.S.L.

Inspection Personnel:

L. Baines

K. Greenfield

K. Jolls

K. Jolls Recorder

# EMBRANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	2 lane asphalt roadway. Some cracking; no major settlement. Catch basin 40' south of auxiliary spillway.	Has not been repaved in 10-15 years.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None observed.	Average height of embankment between spillways - 8'.
SLOUGHING OR EROSION OF EMBANKMENT AND ADJUTENT SLOPES	None observed. Major stream enters river just downstream of left abutment. Also 24" roadway drain. (Presently not damaging fill to left spillway bridge.)	Steep (1:1) downstream slopes each side of left spillway bridge.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Satisfactory (roadway very level).	
RIPRAP FAILURES	No riprap. Some concrete blocks on upstream slopes.	

EMBANKMENT

VISUAL EXAMINATION OF EXCESSIVE SHRUB GROWTH, TREES, ETC.	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
	Both slopes have heavy growth, numerous large trees.	Remove dead trees and root systems.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Satisfactory	
ANY NOTICEABLE SEEPAGE	None but there is large, low wet area 120' right of south spillway.	Doesn't appear to be seepage although roadway has settled 3-4" in that area. Exact cause could not be determined.
STAFF GAGE AND RECORDER	None	
DRAINS	None	



# OUTLET WORKS (RIGHT SPILLWAY)

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	No major structural cracking observed.  ↑	
INTAKE STRUCTURE	Steel sheeting - good condition. Each side of spillway.	See duPont plans. Timber bulkhead at right of spillway. (old but stable condition)
OUTLET STRUCTURE	Paved invert slab thru bridge; extends about 15' beyond next fascia.	
OUTLET CHANNEL	Main river channel.	Large stilling basin being eroded below bridge which indicates heavy flow in this channel.
EMERGENCY GATE	None.	

# UNGATED SPILLWAY (LEFT SPILLWAY)

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	8-3' wide flashboard gates. Timber plank deck built over gate openings.	Top about 6" above weir crest at left spillway. 2.5' headroom to concrete superstructure soffit.
APPROACH CHANNEL	Main lake reservoir. Minor embankment erosion to right of spillway wingwall.	
DISCHARGE CHANNEL	Main downstream channel. Asphalt slope protection above left downstream wingwall.	
BRIDGE AND PIERS	Salem County Br. #4138 Rebuilt '64. Foundation and Structures Inc.	Rebuilt parapets, plinths, and intake on older bridge.

RESERVOIR

REMARKS OR RECOMMENDATIONS

VISUAL EXAMINATION OF

OBSERVATIONS

SLOPES

Steep (5'-10') banks at shoreline  
BSA campgrounds on left shore-  
well above dam crest.

SEDIMENTATION

Appears heavy. Water shallow  
at face of dam.



DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
-----------------------	--------------	----------------------------

CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Meandering channel clear of debris.	Evidence of flooding at downstream dams.
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SLOPES	Irregular, flat	Heavily wooded flood- plain.
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APPROXIMATE NO. OF HOMES AND POPULATION	None in downstream floodplain.	
---	--------------------------------	--

1st downstream dam at East Lake Road: small circular spillway 40± in length.  
Roadway - 4' freeboard.

2nd downstream dam at Memorial Lake 4' freeboard, circular spillway.

2nd bridge. Memorial Lake - 2-20' spans. 3' freeboard.

CHECK LIST  
ENGINEERING DATA  
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
PLAN OF DAM	Not Available
REGIONAL VICINITY MAP	Available (U.S.G.S. Quad)
CONSTRUCTION HISTORY	Some Available (NJDEP)
TYPICAL SECTIONS OF DAM	None Available
HYDROLOGIC/HYDRAULIC DATA	Available (NJDEP)
OUTLETS - PLAN	Some Available (Principal Spillway) - (NJDEP Records)
- DETAILS	Some Available (Principal Spillway) - (NJDEP Records)
- CONSTRAINTS	Not Available
- DISCHARGE RATINGS	Not Available
RAINFALL/RESERVOIR RECORDS	None Available

ITEM

REMARKS

SPILLWAY PLAN . Principal Spillway Plan Available (NJDEP)

SECTIONS Principal Spillway Available (NJDEP)

DETAILS Principal Spillway Available (NJDEP)

OPERATING EQUIPMENT  
PLANS & DETAILS

None



ITEM	REMARKS
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DESIGN REPORTS	None Available
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GEOLOGY REPORTS	None Available
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DESIGN COMPUTATIONS	None Available
HYDROLOGY & HYDRAULICS	Available (NJDEP)
DAM STABILITY	None Available
SEEPAGE STUDIES	" "

MATERIALS INVESTIGATIONS	None Available
BORING RECORDS	" "
LABORATORY	" "
FIELD	" "

POST-CONSTRUCTION SURVEYS OF DAM	Not Available
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BORROW SOURCES.	Some Known (NJDEP)
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ITEM	REMARKS
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MONITORING SYSTEMS	None
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MODIFICATIONS	1951 Modifications Available (NJDEP)
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HIGH POOL RECORDS	None Available
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POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None Available
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PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Some information available (NJDEP) " " "
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MAINTENANCE OPERATION RECORDS	None Available
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May, 1979

View of Camp Karney Dam



May, 1979

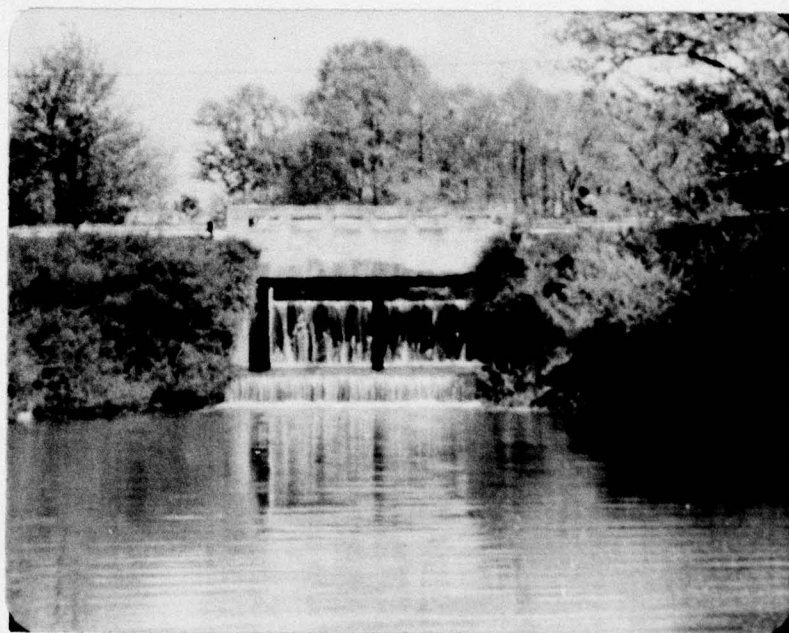
View of Auxiliary Spillway





View of Primary Spillway

May, 1979



Downstream View of Primary Spillway

May, 1979

CHECK LIST  
HYDROLOGIC AND HYDRAULIC DATA  
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 11.8 square miles

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 46.5 MSL (190 acre-feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 52.15 MSL (371 acre-feet)

ELEVATION MAXIMUM DESIGN POOL: Unknown

ELEVATION TOP DAM: 52.15 MSL

CREST: \_\_\_\_\_

- a. Elevation 52.15 MSL
- b. Type Earth embankment with two bridged spillways
- c. Width 30+ feet
- d. Length 640+
- e. Location Spillover Principal at right end; Auxiliary at left end
- f. Number and Type of Gates None

OUTLET WORKS: Principal Spillway

- a. Type Semicircular steel sheet piling arch
- b. Location Right end of dam
- c. Entrance inverts 46.5 MSL
- d. Exit inverts 38.9 MSL
- e. Emergency draindown facilities \_\_\_\_\_

HYDROMETEOROLOGICAL GAGES: None

- a. Type \_\_\_\_\_
- b. Location \_\_\_\_\_
- c. Records \_\_\_\_\_

MAXIMUM NON-DAMAGING DISCHARGE: 2734 cfs

BY D.J.M. DATE 6-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. A1 OF

CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

CAMP KARNEY DAM

PROJECT C 234

SUBJECT \_\_\_\_\_

Time of concentration :

length along watercourse to drainage divide = 3.8 miles  
= 20064 feet

$$\Delta H = 93' \quad \text{Slope} = \frac{93 \times 100}{20,064} = 0.5 \%$$

Assume velocity  $\approx 2 \text{ feet s}^{-1}$

$$\therefore t_c = \frac{20,064}{2 \times 3600} = 2.8 \text{ hours}$$

By California Culverts Method :

$$t_c = \left( \frac{11.9 \times 3.8^2}{93} \right)^{0.385} = 2.12 \text{ hours}$$

Alternative Method :

$$t_c = \frac{L^{1.15}}{7,700 H^{0.38}} = 2.06 \text{ hours}$$

Use  $t_c = 2.4 \text{ hours}$

$$\therefore t_p = \frac{0.5}{2} + 0.6 \times 2.4 = 1.69$$

$$Q_p = \frac{256 \times 11.8}{1.69} = 1787 \text{ cfs}$$



BY D. J. M. DATE 9-79

CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

SUBJECT \_\_\_\_\_

LOUIS BERGER &amp; ASSOCIATES INC.

CAMP KARNEY DAMSHEET NO. A2 OFPROJECT C234

## UNITGRAPH :

<u>Time</u> <u>(hours)</u>	<u>T/Tp</u>	<u>Dimensionless</u> <u>Ordinate (Do)</u>	<u>Q (cfs)</u> <u>= Qp x Do</u>
0.5	0.30	0.24	429
1.0	0.59	0.59	1055
1.5	0.89	0.96	1716
2.0	1.18	0.96	1716
2.5	1.48	0.84	1501
3.0	1.75	0.70	1251
3.5	2.07	0.57	1019
4.0	2.37	0.49	876
4.5	2.66	0.42	751
5.0	2.96	0.36	643
5.5	3.25	0.31	554
6.0	3.55	0.27	483
6.5	3.85	0.23	411
7.0	4.14	0.20	357
7.5	4.44	0.19	340
8.0	4.73	0.17	304
8.5	5.03	0.16	266
9.0	5.33	0.14	250
9.5	5.62	0.13	232
10.0	5.92	0.11	197
10.5	6.21	0.10	179
11.0	6.51	0.08	143
11.5	6.80	0.07	125
12.0	7.10	0.06	107
12.5	7.40	0.045	80
13.0	7.69	0.04	71
13.5	7.99	0.03	54
14.0	8.28	0.025	45
14.5	8.58	0.015	27

BY D. J. M. DATE 6-79

LOUIS BERGER &amp; ASSOCIATES INC.

SHEET NO. A3 OF

CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

CAMP KARNEY DAMPROJECT C 234

SUBJECT \_\_\_\_\_

Precipitation Data :

Taken from T.P. 40 & NOAA Technical Memorandum  
NWS HYDRO 35 (for depth duration curve see overleaf)

<u>Time</u> <u>(hours)</u>	<u>Precipitation</u> <u>(inches)</u>	<u><math>\Delta</math></u> <u>(inches)</u>	<u>Rearrange <math>\Delta</math></u> <u>(inches)</u>
0.5	2.40	2.40	0.12
1.0	3.10	0.70	0.14
1.5	3.70	0.60	0.18
2.0	4.00	0.30	0.30
2.5	4.22	0.22	0.70
3.0	4.40	0.18	2.40
3.5	4.57	0.17	0.60
4.0	4.71	0.14	0.22
4.5	4.84	0.13	0.17
5.0	4.96	0.12	0.13
5.5	5.08	0.12	0.12
6.0	5.20	0.12	0.12



BY LJB DATE 10-79

LOUIS BERGER &amp; ASSOCIATES INC.

SHEET NO. A4 OF

CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

CAMP KARNEY DAMPROJECT C-234

SUBJECT \_\_\_\_\_

SPILLWAY DISCHARGEOver Arch Spillway  
L=50.5Over Left Spillway  
as weir L=24'Over left spillway  
as culvert a=60 ft<sup>2</sup>

H	C	Q
0	3.1	0
1	3.1	157
2	3.1	443
3	3.1	813
4	3.1	1,252
5	3.1	1,750
5.7	3.1	2,130
6	3.1	2,301
6.5	3.1	2,594
7	3.1	2,899
7.5	3.1	3,215
8	3.1	3,542
8.5	3.1	3,880
9	3.1	4,227

H	C	Q
0.5	3.1	26
1.5	3.1	137
2.5	3.1	294

H	C	Q
3.5	0.55	495
4.5	0.55	562
5.2	0.55	604
5.5	0.55	621
6.0	0.55	649
6.5	0.55	675
7.0	0.55	701
7.5	0.55	725
8.0	0.55	749
8.5	0.55	772

## FLOW OVER DAM

L=1415

H C Q

0	2.8	0
0.35	2.8	820
0.85	2.8	3,105
1.35	2.8	6,215
1.85	2.8	9,969
2.35	2.8	14,273
2.85	2.8	19,063
3.35	2.8	24,293

## Σ Q

H	Q
0	0
1	183
2	580
3	1,107
4	1,747
5	2,312
5.7	2,734
6	3,742
6.5	6,348
7	9,789
7.5	13,885
8	18,540
8.5	23,692
9	29,292

← Top of Dam  
ELEV. 52.2 MSL

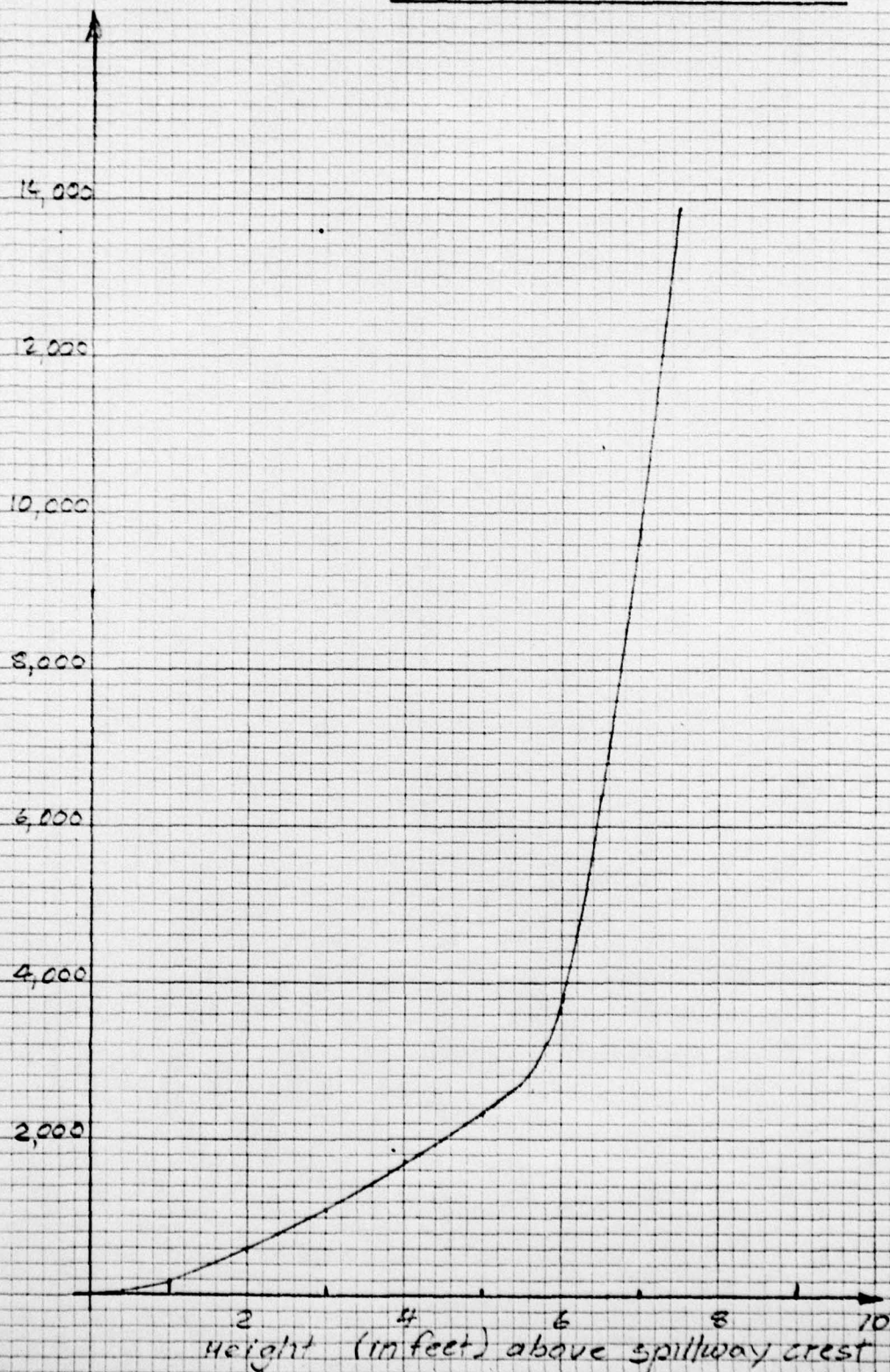


A5

Spillway discharge  
(cfs)

CAMP KARNEY DAM

STAGE DISCHARGE CURVE



BY D. J. M. DATE 6-79

CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

SUBJECT \_\_\_\_\_

LOUIS BERGER & ASSOCIATES INC.

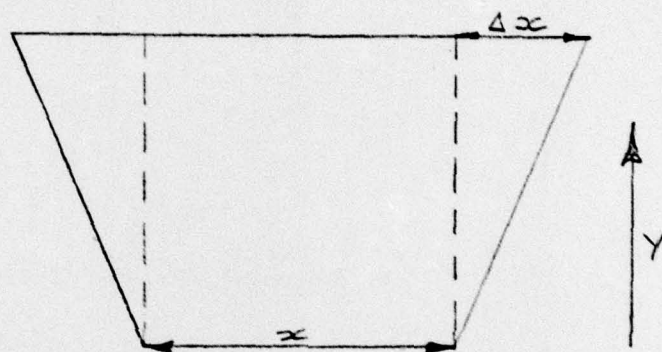
CAMP KARNEY DAM

SHEET NO. A6 OF \_\_\_\_\_

PROJECT C234

Surcharge storage:

Lake area @ normal pool = 25.5 acres  
 " " @ top of dam = 38.5 acres  
 Area of 60' contour = 56.6 acres



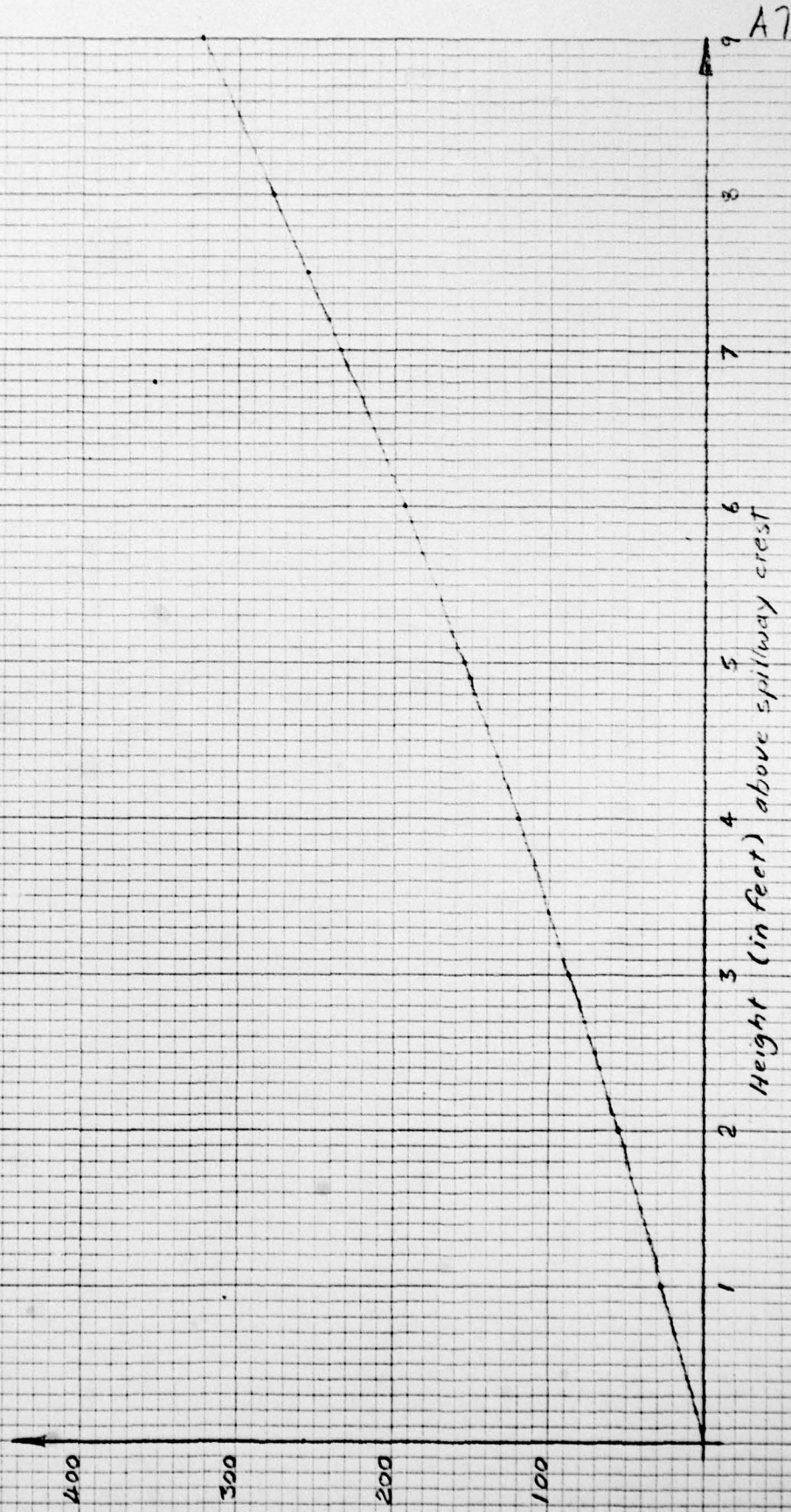
Increment in volume  $\Delta V = (x + \Delta x)y$

<u>Height in feet above crest</u>	<u>Surcharge storage (acre feet)</u>
0	0
1	27
2	56
3	87
4	120
5	156
6	194
7	235
8	278
9	323



surcharge storage  
(acre feet)

CAMP KARNDEY DAM  
STAGE STORAGE CURVE





BY L.J.B. DATE 10-79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. AB OF

CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

CAMP KARNEY DAM

PROJECT G-234

SUBJECT APPROXIMATE DRAWDOWN CALCULATIONS

STORAGE @ NORMAL POOL = 190 acre-feet

AVAILABLE HEAD = 7.6'

ASSUME DRAWDOWN IN TWO STAGES WITH  
ALL 8 SETS OF 3' WIDE STOPLOGS REMOVED

ASSUME INFLOW OF 12 cfs AND NO TAILWATER

STAGE 1       $H = 5.7'$

$$Q = C \cdot L \cdot H^{3/2} - 12 \quad L = 24' \quad C = 3.1$$

$$Q = 3.1(24)(5.7)^{3/2} - 12$$
$$= 1000 \text{ cfs}$$

$$\text{TIME} = \frac{190 \text{ acre-feet} \times 43560 \text{ ft}^2/\text{acre}}{1000 \text{ ft}^3/\text{sec} \times 3600 \text{ sec/hr} \times 2}$$

$$= 1.15 \text{ hours}$$

STAGE 2       $H = 1.9'$

$$Q = 3.1(24)(1.9)^{3/2} - 12$$

$$Q = 183 \text{ cfs}$$

$$\text{TIME} = \frac{190 \text{ acre-feet} \times 43560 \text{ ft}^2/\text{acre}}{183 \text{ ft}^3/\text{sec} \times 3600 \text{ sec/hr} \times 2}$$

$$= 6.28 \text{ hours}$$

TOTAL TIME FOR DRAWDOWN = 6.28 hr + 1.15 hr = 7.43 hrs  
SAY 7.5 hours

BY D.J.M. DATE \_\_\_\_\_  
 CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_  
 SUBJECT \_\_\_\_\_

**LOUIS BERGER & ASSOCIATES INC.**  
CAMP KARNEY DAM

SHEET NO. 19 OF \_\_\_\_\_  
 PROJECT C-224

CAMP KARNEY DAM  
 BY D.J.M.  
 JUNE 29 1979

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
100	0	30	0	0	0	0	0	0	0
JOPER					NWT				
3					0				

SUB-AREA RUNOFF COMPLETION

INFLOW TO RESERVOIR

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	0	0	0	0	1

HYDROGRAPH DATA

IHYDG	IUMG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	11.80	0.0	11.80	0.0	0.0	0	0	0

PRECIP DATA

NP	STORM	DAJ	CAK
12	0.0	0.0	0.0

PRECIP PATTERN

0.12	0.14	0.18	0.30	0.70	2.40	0.60	0.22	0.17	0.13
0.12	0.12								

LOSS DATA

STRMR	DLTKR	RTICL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	0.50	0.10	0.0	0.0

GIVEN UNIT GRAPH, NUF-GG= 29

429.	1055.	1716.	1716.	1501.	1251.	1019.	876.	751.	643.
554.	483.	411.	357.	340.	304.	286.	250.	232.	197.
179.	143.	125.	107.	80.	71.	54.	45.	27.	

UNIT GRAPH TOTALS 15202. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.0 QPCSN= 0.0 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.12	0.00	0.
2	0.14	0.00	0.
3	0.18	0.00	0.
4	0.30	0.20	86.
5	0.70	0.65	490.
6	2.40	2.35	2037.
7	0.60	0.55	4174.
8	0.22	0.17	6101.
9	0.17	0.12	6433.



BY D. J. M. DATE \_\_\_\_\_

CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

SUBJECT \_\_\_\_\_

## LOUIS BERGER &amp; ASSOCIATES INC.

CAMP KARNEY DAMSHEET NO. A10 OF \_\_\_\_\_PROJECT C-234

10	0.13	0.08	5541.
11	0.12	0.07	5215.
12	0.12	0.07	4505.
13	0.0	0.0	3960.
14	0.0	0.0	3459.
15	0.0	0.0	2977.
16	0.0	0.0	2559.
17	0.0	0.0	2207.
18	0.0	0.0	1896.
19	0.0	0.0	1661.
20	0.0	0.0	1520.
21	0.0	0.0	1370.
22	0.0	0.0	1254.
23	0.0	0.0	1119.
24	0.0	0.0	1013.
25	0.0	0.0	885.
26	0.0	0.0	784.
27	0.0	0.0	660.
28	0.0	0.0	568.
29	0.0	0.0	482.
30	0.0	0.0	387.
31	0.0	0.0	326.
32	0.0	0.0	260.
33	0.0	0.0	202.
34	0.0	0.0	129.
35	0.0	0.0	48.
36	0.0	0.0	25.
37	0.0	0.0	16.
38	0.0	0.0	9.
39	0.0	0.0	5.
40	0.0	0.0	2.
41	0.0	0.0	0.
42	0.0	0.0	0.
43	0.0	0.0	0.
44	0.0	0.0	0.
45	0.0	0.0	0.
46	0.0	0.0	0.
47	0.0	0.0	0.
48	0.0	0.0	0.
49	0.0	0.0	0.
50	0.0	0.0	0.
51	0.0	0.0	0.
52	0.0	0.0	0.
53	0.0	0.0	0.
54	0.0	0.0	0.
55	0.0	0.0	0.
56	0.0	0.0	0.
57	0.0	0.0	0.
58	0.0	0.0	0.
59	0.0	0.0	0.
60	0.0	0.0	0.
61	0.0	0.0	0.
62	0.0	0.0	0.
63	0.0	0.0	0.
64	0.0	0.0	0.
65	0.0	0.0	0.
66	0.0	0.0	0.
67	0.0	0.0	0.
68	0.0	0.0	0.
69	0.0	0.0	0.
70	0.0	0.0	0.



BY D.J.M. DATE \_\_\_\_\_  
CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_  
SUBJECT \_\_\_\_\_

LOUIS BERGER & ASSOCIATES INC.  
CAMP KARNEY DAM

SHEET NO. ALL OF \_\_\_\_\_  
PROJECT C-234

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71	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0
73	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0
76	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0
78	0.0	0.0	0.0	0.0	0.0
79	0.0	0.0	0.0	0.0	0.0
80	0.0	0.0	0.0	0.0	0.0
81	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0
83	0.0	0.0	0.0	0.0	0.0
84	0.0	0.0	0.0	0.0	0.0
85	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0
87	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0
89	0.0	0.0	0.0	0.0	0.0
90	0.0	0.0	0.0	0.0	0.0
91	0.0	0.0	0.0	0.0	0.0
92	0.0	0.0	0.0	0.0	0.0
93	0.0	0.0	0.0	0.0	0.0
94	0.0	0.0	0.0	0.0	0.0
95	0.0	0.0	0.0	0.0	0.0
96	0.0	0.0	0.0	0.0	0.0
97	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0
99	0.0	0.0	0.0	0.0	0.0
100	0.0	0.0	0.0	0.0	0.0
SUM	5.20	4.26	64765.		

PEAK 6433.  
CFS  
INCHES  
AC-FT

6-HOUR 4131.  
24-HOUR 1349.  
72-HOUR 648.  
TOTAL VOLUME 64760.  
4.25  
2677.

HYDROGRAPH ROUTING

ROUTING THROUGH RESERVOIR

ISTAO 11

ICOMP 1

QLOSS 0.0

QLOSS 0.0

QLOSS 0.0

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QLOSS 0.0

IECON 0

ITAPE 0

JPLT 0

JPR1 0

ISAME 1

IRIS 0

ISAME 0

TSK 0.0

STORA 0.

LAG 0

AMSK 0.0

X 0.0

TSK 0.0

STORA 0.

LAG 0

AMSK 0.0

X 0.0

TSK 0.0

STORA 0.

IECON 0

ITAPE 0

JPLT 0

JPR1 0

ISAME 1

IRIS 0

ISAME 0

TSK 0.0

STORA 0.

LAG 0

AMSK 0.0

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STORA 0.

LAG 0

AMSK 0.0

X 0.0

TSK 0.0

STORA 0.

IECON 0

ITAPE 0

JPLT 0

JPR1 0

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IRIS 0

ISAME 0

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STORA 0.

LAG 0

AMSK 0.0

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STORA 0.

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AMSK 0.0

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IECON 0

ITAPE 0

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IECON 0

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AMSK 0.0

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TSK 0.0

STORA 0.

IECON 0

ITAPE 0

JPLT 0

JPR1 0

ISAME 1

IRIS 0

ISAME 0

TSK 0.0

STORA 0.

LAG 0

AMSK 0.0

X 0.0

TSK 0.0

STORA 0.

LAG 0

AMSK 0.0

X 0.0

TSK 0.0

STORA 0.

STORAGE=  
OUTFLOW=

0. 27.  
0. 181.

56.  
580.

120.  
1747.

156.  
2311.

194.  
3742.

214.  
6347.

235.  
9789.

278.  
18540.

323.  
29292.

TIME FOR STOR  
1 0.  
2 0.  
3 0.  
4 0.  
5 0.  
6 0.  
7 0.  
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94 0.  
95 0.  
96 0.  
97 0.  
98 0.  
99 0.  
100 0.

BY D. J. M. DATE \_\_\_\_\_  
CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_  
SUBJECT \_\_\_\_\_

**LOUIS BERGER & ASSOCIATES INC.**  
CAMP KARNEY DAM

SHEET NO. A12 OF \_\_\_\_\_  
PROJECT C-234

4	2.	43.	11.
5	12.	288.	79.
6	51.	1263.	518.
7	130.	3105.	1901.
8	203.	5138.	4855.
9	218.	6267.	6948.
10	210.	6187.	5805.
11	207.	5578.	5474.
12	200.	4860.	4578.
13	197.	4232.	4074.
14	191.	3709.	3622.
15	181.	3219.	3269.
16	170.	2768.	2830.
17	159.	2383.	2439.
18	148.	2051.	2193.
19	136.	1778.	1990.
20	123.	1590.	1795.
21	112.	1445.	1609.
22	104.	1312.	1446.
23	96.	1186.	1304.
24	89.	1066.	1174.
25	82.	949.	1051.
26	75.	835.	933.
27	69.	722.	817.
28	63.	614.	706.
29	57.	525.	607.
30	52.	434.	525.
31	47.	356.	451.
32	41.	293.	381.
33	37.	231.	315.
34	32.	165.	249.
35	27.	88.	180.
36	21.	36.	145.
37	17.	20.	114.
38	13.	12.	89.
39	10.	7.	69.
40	8.	3.	53.
41	6.	1.	40.
42	4.	0.	30.
43	3.	0.	23.
44	3.	0.	17.
45	2.	0.	13.
46	1.	0.	10.
47	1.	0.	7.
48	1.	0.	6.
49	1.	0.	4.
50	0.	0.	3.
51	0.	0.	2.
52	0.	0.	2.
53	0.	0.	1.
54	0.	0.	1.
55	0.	0.	1.
56	0.	0.	1.
57	0.	0.	0.
58	0.	0.	0.
59	0.	0.	0.
60	0.	0.	0.
61	0.	0.	0.
62	0.	0.	0.
63	0.	0.	0.
64	0.	0.	0.



BY D. J. M. DATE \_\_\_\_\_  
 CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_  
 SUBJECT \_\_\_\_\_

**LOUIS BERGER & ASSOCIATES INC.**  
**CAMP KARNEY DAM**

SHEET NO. A13 OF \_\_\_\_\_  
 PROJECT C-234

65	0.	0.	0.
66	0.	0.	0.
67	0.	0.	0.
68	0.	0.	0.
69	0.	0.	0.
70	0.	0.	0.
71	0.	0.	0.
72	0.	0.	0.
73	0.	0.	0.
74	0.	0.	0.
75	0.	0.	0.
76	0.	0.	0.
77	0.	0.	0.
78	0.	0.	0.
79	0.	0.	0.
80	0.	0.	0.
81	0.	0.	0.
82	0.	0.	0.
83	0.	0.	0.
84	0.	0.	0.
85	0.	0.	0.
86	0.	0.	0.
87	0.	0.	0.
88	0.	0.	0.
89	0.	0.	0.
90	0.	0.	0.
91	0.	0.	0.
92	0.	0.	0.
93	0.	0.	0.
94	0.	0.	0.
95	0.	0.	0.
96	0.	0.	0.
97	0.	0.	0.
98	0.	0.	0.
99	0.	0.	0.
100	0.	0.	0.

SUM 64760.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6948.	4006.	1349.	648.	64760.
INCHES		3.16	4.25	4.25	
AC-FT		1988.	2677.	2677.	2677.

**RUNOFF SUMMARY, AVERAGE FLOW**

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	6433.	4131.	1349.	648.	11.80
ROUTED TO	11	6433.	4131.	1349.	648.	11.80



REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NJ00106	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report National Dam Safety Program Camp Karney Dam Salem County, N.J.		5. TYPE OF REPORT & PERIOD COVERED (9) FINAL rept.
7. AUTHOR(s) F. Keith Jolls	8. CONTRACT OR GRANT NUMBER(s) (15) DACW61-79-C-0011 ✓	
9. PERFORMING ORGANIZATION NAME AND ADDRESS Louis Berger &- Assoc. 100 Halstead St. East Orange, N.J. 07019		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS (12) 61
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, Philadelphia Custom House, 2d & Chestnut Streets Philadelphia, Pennsylvania 19106		12. REPORT DATE (11) August 1979 ✓
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES 60 (approx)
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18. SUPPLEMENTARY NOTES  Copies are obtainable from National Technical Information Service, Springfield, Virginia, 22151.		
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.		